

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application) PATENT APPLICATION
Inventors: Rashid, et al.)
Application No.: Unknown)
Filed Date: December 21, 2001)
Title: CROSS-BAR SWITCH SUPPORTING) Customer No.: 28554
IMPLICIT MULTICAST ADDRESSING)
_____)

PRELIMINARY AMENDMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants respectfully request that the Examiner enter the following amendments to the above-identified patent application, which is a continuation of U.S. Patent Application Serial No. 09/900,514, assigned to Group Art Unit 2661.

AMENDMENTS

Please amend the application as follows:

In the Claims:

Please replace claims 1-38 with claims 39-78 as shown below. Applicants add new claims 39-78 and cancel claims 1-38. All pending claims are reproduced below.

39. (new) A cross-bar switch comprising:
a set of input ports to receive data packets;

a set of sink ports in communication with said set of input ports to receive and forward said data packets; and

a first port address table adapted to identify a plurality of destinations supported by a first sink port in said set of sink ports.

40. (new) The cross-bar switch of claim 39, further including:

a set of port address tables, wherein each port address table in said set of port address tables is adapted to identify a plurality of destinations supported by a sink port in said set of sink ports.

41. (new) The apparatus of claim 39, further including:

a second port address table adapted to identify a second destination as being supported by a second sink port in said set of sink ports,

wherein said first port address table identifies said second destination as being supported by said first sink port.

42. (new) The cross-bar switch of claim 39, wherein said first port address table is adapted to store data identifying a plurality of destinations supported by said first sink port.

43. (new) The cross-bar switch of claim 39, wherein each sink port in said set of sink ports is adapted to concurrently receive a plurality of data packets having different destination addresses.

44. (new) The cross-bar switch of claim 39, further including:

a set of data rings in communication with said set of input ports and said set of sink ports.

45. (new) The cross-bar switch of claim 44, wherein said set of data rings couples each sink port in said set of sink ports to each input port in said set of input ports

46. (new) The cross-bar switch of claim 45, wherein each sink port in said set of sink ports snoops data packets on each data ring in said set of data rings.

47. (new) The cross-bar switch of claim 44, wherein said set of data rings includes a plurality of data rings.

48. (new) The cross-bar switch of claim 39, wherein said first sink port snoops data packets received by said set of input ports and determines whether to accept a first data packet based on a set of criteria, wherein said set of criteria includes said first data packet being targeted to a destination identified in said first port address table.

49. (new) The cross-bar switch of claim 48, wherein said set of criteria further includes:

said first sink port having sufficient storage space for storing said first data packet, and

a total number of packets being received by said first sink port not exceeding a predetermined number of packets.

50. (new) The cross-bar switch of claim 39, wherein said first sink port includes:

an interface in communication with said set of input ports to receive data from data packets;

a storage buffer coupled to said interface to receive and store said data; and

an output port coupled to said storage buffer to receive said data from said storage buffer and transmit said data on a communications link.

51. (new) The cross-bar switch of claim 50, wherein said storage buffer is adapted to concurrently store a plurality of data packets.

52. (new) The cross-bar switch of claim 50, wherein said interface is adapted to access said first port address table to determine whether a data packet

has a destination address corresponding to a destination identified in said first port address table.

53. (new) The cross-bar switch of claim 39, wherein said first sink port includes a configuration block adapted to receive configuration packets.

54. (new) The cross-bar switch of claim 53, wherein said configuration block is adapted to store destination identifiers from said configuration packets in said first port address table.

55. (new) A cross-bar switch comprising:
a set of input ports to receive data packets;
a set of sink ports in communication with said set of input ports to receive and forward said data packets;

a set of data rings in communication with said set of input ports and said set of sink ports; and

a set of port address tables in communication with said set of sink ports, wherein each port address table in said set of port address tables is adapted to identify a plurality of destinations supported by a sink port in said set of sink ports.

56. (new) The cross-bar switch of claim 55, wherein said set of port address tables includes a first port address table adapted to store data identifying a plurality of destinations supported by a first sink port in said set of sink ports.

57. (new) The apparatus of claim 56, further including:
a second port address table adapted to store data identifying a second destination as being supported by a second sink port in said set of sink ports,
wherein said first port address table identifies said second destination as being supported by said first sink port.

58. (new) The cross-bar switch of claim 56, wherein said first sink port snoops data packets on each data ring in said set of data rings and determines

whether to accept a first data packet based on a set of criteria, wherein said set of criteria includes said first data packet being targeted to a destination identified in said first port address table.

59. (new) The cross-bar switch of claim 58, wherein said set of criteria further includes:

said first sink port having sufficient storage space for storing said first data packet, and

a total number of packets being received by said first sink port not exceeding a predetermined number of packets.

60. (new) The cross-bar switch of claim 56, wherein said first sink port includes:

a ring interface coupled to said set of data rings to receive data from data packets;

a storage buffer coupled to said ring interface to receive and store said data; and

an output port coupled to said storage buffer to receive said data from said storage buffer and transmit said data on a communications link.

61. (new) The cross-bar switch of claim 60, wherein said storage buffer is adapted to concurrently store a plurality of data packets.

62. (new) The cross-bar switch of claim 60, wherein said ring interface is adapted to access said first port address table to determine whether a packet on said set of data rings has a destination address corresponding to a destination identified in said first port address table.

63. (new) The cross-bar switch of claim 55, wherein said first sink port includes a configuration block adapted to receive configuration packets.

64. (new) The cross-bar switch of claim 63, wherein said configuration block is adapted to store destination identifiers from said configuration packets in said first port address table.

65. (new) A method comprising the steps of:
(a) a set of input ports receiving a set of data packets;
(b) a sink port in a set of sink ports, accepting data packets in said set of data packets, wherein said step (b) includes the step of:

(1) said sink port determining that a first data packet has a first destination supported by said sink port,

(2) said sink port accepting said first data packet,

(3) said sink port determining that a second data packet has a second destination supported by said sink port, wherein said first destination is different than said second destination, and

(4) said sink port accepting said second data packet; and

(c) said sink port, collecting data for data packets accepted by said sink port, wherein said step (c) includes the steps of:

(1) said sink port collecting data for said first data packet, and

(2) said sink port collecting data for said second data packet.

66. (new) The method of claim 65, further including the step of:

(d) transferring said set of data packets from said set of input ports to a set of data rings in communication with said set of sink ports.

67. (new) The method of claim 65, further including the steps of:

(e) an input port in said set of input ports receiving a configuration packet containing data identifying destinations supported by said sink port; and

(f) said sink port collecting data from said configuration packet, wherein said data collected in said step (f) identifies destinations supported by said sink port.

68. (new) The method of claim 67, wherein said data collected in said step (f) identifies said first destination and said second destination.

69. (new) The apparatus of claim 65, wherein said step (b)(1) includes the step of:

(i) said sink port identifying data in a port address table indicating that said sink port supports said first destination, and

wherein said step (b)(3) includes the step of:

(ii) said sink port identifying data in said port address table indicating that said sink port supports said second destination.

70. (new) The method of claim 65, wherein said step (b) includes the step of:

(5) said sink port determining whether a set of criteria is met, wherein said step (b)(5) includes the steps of:

(i) determining whether said sink port is enabled to receive data packets;

(ii) determining whether said sink port has sufficient resources to store said first data packet and said second data packet;

(iii) determining whether said sink port is currently receiving a maximum allowable number of packets;

(iv) determining whether said first data packet has a number of bytes within a predetermined range; and

(v) determining whether said second data packet has a number of bytes within a predetermined range.

71. (new) The method of claim 65, further including the step of:

(g) said sink port issuing a rejection signal if said sink port determines not to accept said data packet in said step (b), wherein said rejection signal terminates further reception of said data packet by said sink port.

72. (new) The method of claim 65, further including the step of:

(h) said sink port transmitting said data packets collected in said step (c).

73. (new) The method of claim 65, further including the steps of:
- (j) a second sink port in said set of sink ports, accepting data packets in said set of data packets, wherein said step (j) includes the step of:
 - (1) said second sink port determining that said first data packet is targeted for said first destination, and
 - (2) said second sink port accepting said first data packet; and
 - (k) said second sink port collecting data for data packets accepted by said second sink port, wherein said step (k) includes the step of:
 - (1) said second sink port collecting data for said first data packet.

74. (new) A method comprising the steps of:
- (a) a set of input ports receiving a set of data packets;
 - (b) transferring said set of data packets from said set of input ports to a set of data rings in communication with a set of sink ports;
 - (c) a sink port in said set of sink ports, accepting data packets in said set of data packets from said set of data rings, wherein said step (c) includes the steps of:
 - (1) said sink port determining that a first data packet has a first destination supported by said sink port,
 - (2) said sink port accepting said first data packet,
 - (3) said sink port determining that a second data packet has a second destination supported by said sink port, wherein said first destination is different than said second destination, and
 - (4) said sink port accepting said second data packet; and
 - (d) said sink port collecting data for data packets accepted by said sink port, wherein said step (d) includes the steps of:
 - (1) said sink port collecting data for said first data packet, and
 - (2) said sink port collecting data for said second data packet.

75. (new) The method of claim 74, further including the steps of:
- (e) an input port in said set of input ports receiving a configuration packet containing data identifying destinations supported by said sink port; and

(f) said sink port collecting data from said configuration packet in said set of configuration packets, wherein said data collected in said step (f) identifies destinations supported by said sink port.

76. (new) The apparatus of claim 74, wherein said step (c)(1) includes the step of:

(i) said sink port identifying data in a port address table indicating that said sink port supports said first destination, and

wherein said step (c)(3) includes the step of:

(ii) said sink port identifying data in said port address table indicating that said sink port supports said second destination.

77. (new) The method of claim 74, wherein said step (c) includes the step of:

(5) said sink port, determining whether a set of criteria is met, wherein said step (c)(5) includes the steps of:

(i) determining whether said sink port is enabled to receive data packets;

(ii) determining whether said sink port has sufficient resources to store said first data packet and said second data packet;

(iii) determining whether said sink port is currently receiving a maximum allowable number of packets;

(iv) determining whether said first data packet has a number of bytes within a predetermined range; and

(v) determining whether said second data packet has a number of bytes within a predetermined range.

78. (new) The method of claim 74, further including the steps of:

(g) a second sink port in said set of sink ports accepting data packets in said set of data packets, wherein said step (g) includes the step of:

(1) said second sink port determining that said first data packet is targeted for said first destination, and

- (2) said second sink port accepting said first data packet; and
- (h) said second sink port collecting data for data packets accepted by said second sink port, wherein said step (h) includes the step of:
- (1) said second sink port collecting data for said first data packet.

In the Specification:

Please replace the title of the above-identified patent application appearing at page 1, line 1 of the application with the title appearing below. A marked up copy of the amended title is shown in Appendix A to this Amendment.

CROSS-BAR SWITCH SUPPORTING IMPLICIT MULTICAST ADDRESSING

In the Abstract:

Please replace the ABSTRACT of the above-identified patent application appearing at page 43 of the application with the ABSTRACT appearing below. A marked up copy of the amended ABSTRACT is shown in Appendix B to this Amendment.

A cross-bar switch includes a set of input ports and a set of sink ports in communication with the input ports. The input ports receive packets, which are snooped by the sink ports. The cross-bar switch also includes a set of port address tables. Each port address table is adapted to store data identifying a plurality of destinations supported by a sink port. For example, a first port address table is adapted to identify a plurality of destinations supported by a first sink port in the set of sink ports. When determining whether to accept a packet, a sink port considers whether the packet's destination is identified in the sink port's port address table. By supporting multiple destinations, a port address table implicitly facilitates a sink port's multicast operation.

REMARKS

Applicants respectfully submit that claims 39-78 are in order for allowance and request consideration of these claims.

The Commissioner is authorized to change any underpayment or credit any overpayment to Deposit Account No. 501826 for any matter in connection with this document.

Respectfully submitted,

Date: December 21, 2001

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APPENDIX A

The title of the patent application appearing at page 1, line 1 of the application has been amended as follows:

CROSS-BAR SWITCH SUPPORTING IMPLICIT MULTICAST ADDRESSING

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APPENDIX B

The ABSTRACT of the patent application appearing at page 43 of the application has been amended as follows:

[A cross-bar switch includes a set of input ports for receiving data packets and a set of sink ports for transmitting the received packets to identified targets. A set of data rings couples the input ports to the sink ports. Each sink port utilizes the set of data rings to simultaneously accept multiple data packets targeted to the same destination — creating a non-blocking cross-bar switch. Sink ports are also each capable of supporting multiple targets — providing the cross-bar switch with implicit multicast capability.]

A cross-bar switch includes a set of input ports and a set of sink ports in communication with the input ports. The input ports receive packets, which are snooped by the sink ports. The cross-bar switch also includes a set of port address tables. Each port address table is adapted to store data identifying a plurality of destinations supported by a sink port. For example, a first port address table is adapted to identify a plurality of destinations supported by a first sink port in the set of sink ports. When determining whether to accept a packet, a sink port considers whether the packet's destination is identified in the sink port's port address table. By supporting multiple destinations, a port address table implicitly facilitates a sink port's multicast operation.